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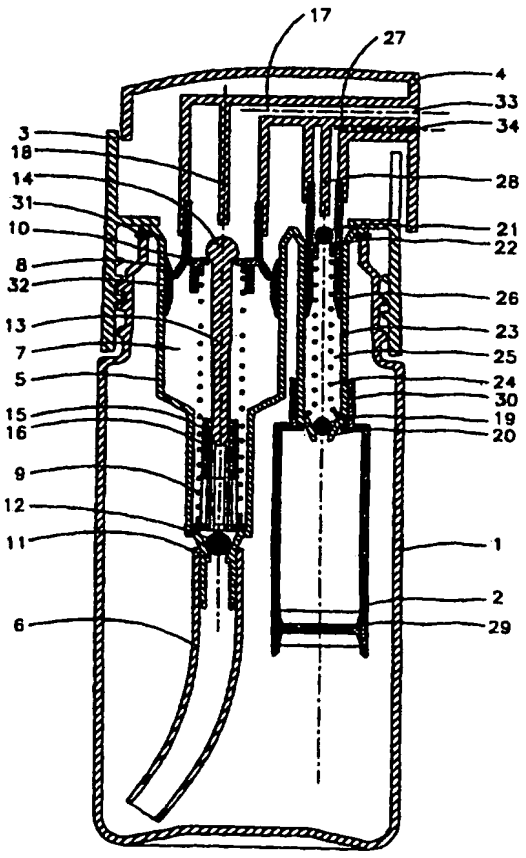
(54) Title: AEROSOL INTENDED FOR DISPENSING A MULTI-COMPONENT MATERIAL

(57) Abstract

Aerosol intended for dispensing several components for the production of a multi-component material, in particular a paste-like cosmetic material, at least comprising a dispensing assembly, a main container (1) and one or more separate auxiliary containers (2) for components to be dispensed, in which the one or more auxiliary containers (2) are accommodated in the main container (1) and designed in such a way that they can be removed from the main container (1) together with the dispensing assembly, the dispensing assembly comprising piston pumps (5, 23; 90, 91; 110) for pumping the components to be dispensed out of the containers (1, 2) to one or more dispensing openings (33, 34; 54; 96, 98; 121), a common control part (4) being present for operating the piston pumps (5, 23; 90, 91; 110), in which the piston pumps (5, 23; 90, 91; 110) comprise a piston chamber (7, 25; 92, 66; 170) with an inlet and an outlet and a piston (8, 26, 93, 107, 117) which is movable in the piston chamber (5, 23; 90, 91; 110), while a non-return valve is present in the inlet and the outlet of the piston chambers (7, 25; 92, 66; 170) of the piston pumps (5, 23; 90, 91; 110), in which the non-return valve in the inlet of at least one of the piston chambers (7, 25; 92, 66; 170) of the piston pumps (5, 23; 90, 91; 110) which are connected to the auxiliary containers (2) is in the form of a non-return ball check valve, and in which at least one of the auxiliary containers (2) is in the form of a container with variable volume.



Short title: Aerosol intended for dispensing a multi-component material

The present invention relates to an aerosol intended for dispensing several components for the production of a multi-component material, in particular a paste-like cosmetic material.

A number of such aerosols are known in the prior art, but they all have different disadvantages.

In this connection attention is drawn to WO-A-93/04940 and WO-A-95/30490. WO-A-93/04940 discloses an aerosol for dispensing two liquid materials from two concentric containers with variable volume, namely a main container and an auxiliary container. The containers comprise a freely movable piston at one end thereof, so that the volume of liquid material drawn from the containers need not be replenished with air from the environment. In addition, the aerosol comprises a dispensing assembly with two concentric piston pumps and a common control part. The piston pumps each comprise a piston chamber with an inlet and an outlet and a piston which is movable therein. The inlets and outlets are provided with non-return valves, in order to permit the passage of liquid material in only one direction.

Preloaded sealing rings and valve flaps are used as the non-return valves, but in practice these are found to be unreliable non-return valves. This makes it difficult to set the ratio between the components to be dispensed.

Moreover, the construction of the aerosol as a whole makes it impossible to remove the dispensing assembly with the auxiliary container from the main container, for example in order to permit the insertion of another auxiliary container into the main container, so that at a desired moment another combination of components to be dispensed can be used, or in order to permit the fitting of the auxiliary container prior to the first use. The technical standards set for the outer container mean that

in the prior art, all of them have considerable disadvantages, which stand in the way of a flexible, lasting and reproducible use of the aerosol in practice.

The object of the present invention is to provide an aerosol of the type mentioned in the preamble which does not have the abovementioned disadvantages and has generally improved characteristics. For this purpose, in a first aspect according to the invention provision is made for an aerosol intended for dispensing several components for the production of a multi-component material, in particular a paste-like cosmetic material, at least comprising a dispensing assembly, a main container and one or more separate auxiliary containers for components to be dispensed, in which the one or more auxiliary containers are accommodated in the main container and designed in such a way that they can be removed from the main container together with the dispensing assembly, in which the dispensing assembly comprises piston pumps for pumping the components to be dispensed out of the containers to one or more dispensing openings, a common control part being present for operating the piston pumps, in which the piston pumps comprise a piston chamber with an inlet and an outlet and a piston which is movable in the piston chamber, while a non-return valve is present in the inlet and the outlet of the piston chambers of the piston pumps, in which the non-return valve in the inlet of at least one of the piston chambers of the piston pumps which are connected to the auxiliary containers is in the form of a non-return ball check valve, and in which at least one of the auxiliary containers is in the form of a container with variable volume.

The aerosol according to the invention has the advantages of the aerosols of the prior art discussed earlier, but not the disadvantages. The aerosol is not limited to dispensing a special multi-component material, and can be used in many different fields. The use of a non-return ball check valve in the inlet of the piston chamber of at least one piston pump connected to an auxiliary container ensures that a substantially unambiguous separ-

etc. The present invention is not limited to any of the above materials, but for the sake of clarity the remainder of the description will refer in the main to paste-like cosmetic material, in particular rejuvenation products based on enzymes.

The aerosol according to the invention not only produces the abovementioned advantages, but also makes it possible to use a standard aerosol in which a dispensing assembly according to the invention with one or more auxiliary containers is accommodated.

The components to be dispensed with the aerosol according to the invention are not particularly limited, and can comprise both liquid and gaseous components. The components themselves can also consist of several constituents. The components can be dispensed from different dispensing openings. It is also possible for the components to be mixed beforehand in a mixing chamber or in an outflow channel prior to dispensing from a common dispensing opening. This mixing can be carried out in a mixing chamber specially provided for the purpose or by so-called mixing vanes or mixing ribs in the outflow channel. In other words, the mixing of the components concerned can be carried out before, during or after dispensing thereof.

The piston pumps are in particular concentric piston pumps. It is most preferable to have the same number of piston pumps as components to be dispensed.

The aerosol preferably contains one auxiliary container. A very simple construction of the aerosol with relatively few parts is obtained in this way. Moreover, only two components are generally used, these components being mixed with each other only during or just prior to dispensing.

In particular, one or more of the non-return valves present are placed under a suitable preload, so that material is allowed through only above a certain pressure. This ensures that should a vacuum occur in the environment, for example in an aircraft, the contents of the container concerned do not escape from the aerosol. It is advantageous for the preloading of the non-return valves in

components to be dispensed, which dispensing assembly comprises dispensing means for conveying the components to be dispensed out of the containers to one or more dispensing openings, and a control part is present for operating the dispensing means, while air pumping means, mixing means and foam-forming means are also present for mixing the components with air prior to dispensing and foaming thereof for the formation of a foam.

The components can be forced out of the containers concerned by means of a propellant, which containers can be placed in communication with an outflow opening by means of suitable valves, while air is mixed in during the propelling and the mixture formed in this way with the foam-forming means is foamed. Foam-forming means can be, for example, sieves or other porous parts. The air pumping means can be in the form of a separate container already under air pressure or to be placed under air pressure, or in the form of an air pump which can supply air to the components during dispensing.

Instead of propellant, other ways of dispensing the components can also be applied, for example piston pumps, positive-displacement pumps, pressure pumps, and all other suitable pumps known in this field.

Although this aerosol can be designed in many different ways and, by slight adaptation of existing aerosols, the inventive idea on which it is based is suitable for dispensing several components, the dispensing assembly, the main container and the one or more auxiliary containers are advantageously designed as defined earlier for the aerosol intended for dispensing several components according to the invention.

In this case the air pumping means are preferably in the form of an air piston pump which is concentric with the remaining piston pumps and is designed to mix air as a component with several liquid components, thus forming a foam.

In a third aspect the invention provides an auxiliary container intended for an aerosol according to the invention.

Fig. 7 shows another modified embodiment of the aerosol according to Fig. 4;

Figs. 8a and 8b show an enlarged view of an auxiliary container with closed and broken membrane; and

Fig. 9 shows a modified embodiment of the aerosol according to Fig. 5.

The aerosol shown in Fig. 1 comprises a main container 1 which has a dispensing assembly with an auxiliary container 2 fixed therein, a fixing collar 3 being screwed on the main container 1, which collar serves for fixing of the dispensing assembly. The dispensing assembly comprises two piston pumps 5 and 23, for pumping material out of the main container 1 and the auxiliary container 2 respectively, and a common control part 4.

The piston pump 5 is connected to a riser tube 6 which extends near to the bottom of the main container 1. The pump 5 comprises a piston chamber 7, containing a piston 8 which is movable by the control part 4 and interacts with a resetting spring 9. The piston pump 5 comprises a non-return valve in the inlet of the piston chamber 7, consisting of a ball 12 which interacts with a seat 11 and serves to draw the component out of the main container into the piston chamber 7, but to prevent it from flowing back into the main container through the riser tube 6. A second non-return valve is also present at the outflow side or the outlet of the piston chamber 7 of the piston pump 5, which valve comprises an actively operated elongated closing element 13 which interacts with a seat 10. This element 13 comprises a spherical sealing element 14 at one end and a collar 15 at the other end. Said collar can interact with a limiting element 16 which supports the spring 9 and is provided with openings in the periphery thereof. The limiting element is fixed in the bottom of the piston chamber 7.

When the aerosol is being used, the control part 4 will be pressed downwards, with the result that the piston chamber 7 is emptied by means of the piston 8 into the channel 17. The spherical part 14 leaves the seat 10, and

the container 2 and the pump 23 and the choice of dimensions and the like are advantageously unique for each component, so that incorrect use of components is ruled out.

In the case of this embodiment according to Fig. 1 the pumps 5 and 23 are in the form of a pump assembly, which is fixed by the fixing collar 3 on the main container 1, with the interposition of a sealing ring 31.

Although in this embodiment the control part 4 comprises a nozzle with two separate dispensing openings 33 and 34, it is, of course, possible to connect the two pumps to a common dispensing opening, possibly with the interposition of a mixing chamber or mixing vanes or the like in a common outflow channel. The ratio between the quantities of components to be dispensed from main and auxiliary container can also easily be set by a suitable choice of the dimensions of the pumps.

With the aerosol according to Fig. 1 it is possible to remove the dispensing assembly with the auxiliary container 2 from the main container 1. This can be advantageous if, for example, one wishes to mix another auxiliary component with the main component, so that another auxiliary container needs to be attached. This can also be advantageous during the first use, because it means that the aerosol can be supplied with, for example, separately added auxiliary containers which can be fitted as desired on the dispensing assembly.

Fig. 2 shows a special embodiment of the pump 5 of the aerosol according to Fig. 1, in which corresponding parts have been indicated by corresponding reference numbers. In the case of this pump, apart from the conventional parts, such as the piston chamber 7 and the piston 8, a sealing element 35 is present, which sealing element can interact with a sealing element 36. The sealing element 35 can also interact with a seat 37 in the inlet of the piston chamber 7, in order to interrupt the communication between the piston chamber 7 and the main container when material is being dispensed.

The sealing element 35 comprises an elongated

accommodated in the outflow channel of the auxiliary component.

The projection 49 and the sealing ring 47 are preferably situated as close as possible to dispensing openings 54, in order to make the dead space past the sealing ring 47 as small as possible.

Fig. 4 shows an embodiment of the aerosol according to the invention comprising a main container 1 and an auxiliary container 2, the latter comprising a freely movable piston 29. The two containers 1 and 2 are each connected to their own piston pump, but in this case the two pumps are concentric piston pumps. A pump 90 for the auxiliary container 2 works in a manner corresponding to that of the pump shown in Fig. 2 and will therefore not be discussed further. A pump 91 for the main container 1 comprises a piston chamber 92 and an annular piston 93 which is freely movable therein and is connected to the piston of the pump 90. Channels 94, which are closed off by a sealing ring 95 acting as a non-return valve, are also present. The sealing ring 95 is fixed around the opening thereof and when material is being dispensed to the outside can bulge out near the periphery, and in this way clear the passage, with the result that the channels 94 are placed in communication with an annular dispensing opening 96. Material can be pumped by means of the pump 90 out of the container 2 through a channel 97 to a central dispensing opening 98.

In the case of the non-return ball check valve in the inlet of the piston chamber 92, comprising the ball 11 and the seat 10, lugs 101 are situated above the ball, in order to prevent the ball from moving in the piston chamber 92 during filling of said piston chamber 92. Furthermore, a ventilation opening 32 is again present in the wall of the piston chamber 92, for ventilating the main container 1.

In this case the entire dispensing assembly with the auxiliary container 2 is fixed on the main container by means of a screw cap 100, with the interposition of a sealing ring 99.

Fig. 5 shows an embodiment of a dispensing assembly

Moreover, passages 118 are likewise present between the piston rod 104 and the piston 117, possibly in the form of an annular channel.

When the aerosol is being used, during the dispensing the sealing rib 112 on the piston 111 will form a seal against the annular flange stop 116, and air will be able to pass through between sealing rib 113 and the flange stop 115 to the passages 119. The components from the main container and auxiliary container meet with air in the mixing chamber 127 and are mixed there, after which a foam is formed with the aid of suitable foam-forming means.

Fig. 6 shows an enlarged detail of the encircled part of Fig. 5. Clearly visible are the control cylinder 60, the piston rod 104 and the piston 117 with the channel 118 present between them, and also the passages 119 for the supply of air between the piston rod 104 and the control cylinder 60.

The control part 4 comprises a through-going central channel 122 in the control cylinder 60, which channel is provided locally with an inward directed annular shoulder, so that the control cylinder 60 can rest by means of said shoulder on the piston rod 104, with the interposition of lugs or grooves in one of the two parts.

The piston 117 is connected to the piston rod 104 by means of connecting bridges 62, which also serve as spacers for forming the annular channel 118.

At the end closest to the control cylinder 60, the piston 117 is provided with a cap 123 with peripheral openings 124 which are directed obliquely upwards in the outflow direction. The presence of these radially directed openings 124 ensures that very good mixing between the two components which are fed in can be obtained. The mixture formed in this way enters the channel 122 in the form of a cylindrical column, which column at right angles thereto is met by air supplied through passages 119, which produces very good mixing. In this connection attention is drawn to EP-A-0 483 240.

Near said cap 123, just below the openings 124, a sealing ring 125 is present in the control piston 117,

A ball 135 is present in the piston chamber 132 between a seat 136 and lugs 137. Said ball serves as the non-return ball check valve in the inlet of the piston chamber 132. The piston 133 also comprises a non-return valve, comprising a ball 138 between a seat 139 in the piston 133 and a spring 140 which is present in the outlet of the piston chamber 132. The spring 140 serves to give a certain preload to the ball 135, so that if a vacuum occurs in the environment, for example in an aircraft, material is prevented from escaping from the aerosol.

The piston 133 also comprises an additional sealing collar 141, which serves as a non-return valve under preload in the outlet of the piston chamber 142 of the pump 91 for pumping material out of the main container 1. The piston pump 91 comprises a hollow piston 93 which is likewise connected to the control part 4 and which can be placed in communication with the dispensing opening 96 by way of a channel 142.

Reference number 131 indicates a spring which rests on the underside of the piston chamber 92 and connecting bridges 129 on the piston 93. Said spring 131 serves as a restoring means for the control part of the two pumps 90 and 91. The connecting bridges 129 connect the piston 93 to the piston 133 and ensure the correct mutual distance for the formation of a channel between them.

Both dispensing openings 96 and 98 are disposed eccentrically, so that a striped product can be dispensed if materials of different colours are being dispensed.

The auxiliary container 2 comprises a coupling neck 143 which can be snapped onto a bevelled connecting bush 144. Reference number 145 shows a broken membrane, and 145' shows the original state of the membrane 145. The type and the mode of operation of the connecting bush 144 and the membrane 145 will be explained in greater detail in Fig. 8.

Figs. 8a and 8b show an embodiment of the connection between the connecting bush 144 of the dispensing assembly and the neck 143 of the auxiliary container 2, in which the auxiliary container 2 comprises a breakable membrane 145 which is still closed in Fig. 8a and has been

through sieves 120 and foamed, and dispensed through a dispensing opening 121.

The pumps 90, 91 and 110 are disposed concentrically and comprise a combined common piston 156. The piston 156 comprises passages 171 for conveying air to the mixing chamber 155, an annular channel 157 for taking material from the main container 1 to the mixing chamber 155, and a middle channel 158 for taking material from the auxiliary container 2 to the mixing chamber 155. The pump 90 comprises a piston chamber 159, and the pump 91 a piston chamber 160. The piston 156 comprises the piston 133 of the pump 90 and the piston 93 of the pump 91. The annular channel 157 and passages 65 are present between said pistons 93 and 133.

A sealing part 163 forms part of the piston 133 and comprises a cup-shaped attachment 164 with a lateral passage 165 under the bottom of the cup-shaped attachment 164, which passage can be placed in communication with the middle channel 158. The sealing part 163 also comprises two sealing collars 161 and 162 which serve as non-return valves under slight preload for the pump 90 and the pump 91 respectively. The sealing collar 161 interacts with the opening 165 in the cup-shaped attachment 164, and the sealing collar 162 interacts with the inside wall of the piston 93.

The piston chamber 159 both at the inlet and at the outlet comprises a non-return ball check valve with a ball between a seat and limiting lugs, the mode of operation of which has already been explained with reference to other embodiments.

The combined piston 156 also comprises a circumferential flange 166 which at the periphery thereof is provided locally with recesses 167. Said flange 166 interacts with an annular sealing element 168 with dual function. Said sealing element 168 forms a non-return valve for an inlet opening 169 in the air piston 111 for the admission of air into the air piston chamber 170, and likewise works to allow air to flow out of the chamber 170 to channels 171 between the air piston 111 and the combined

which is oxygen-impermeable, while the auxiliary container still possesses the required flexibility to allow its volume to be reduced.

the ratio between the volume of main component to be displaced per pump stroke and the volume of auxiliary component is at least 10:1.

5. Aerosol according to one or more of the preceding claims, characterized in that each non-return valve in the inlet of a piston chamber (7, 25; 92, 66; 170) of a piston pump (5, 23; 90, 91; 110) connected to a container comprises a non-return ball check valve.

6. Aerosol intended for dispensing several components in foam form for the production of a multi-component foam material, in particular a paste-like cosmetic foam, at least comprising a dispensing assembly, a main container (1) and one or more auxiliary containers (2) for components to be dispensed, which dispensing assembly comprises dispensing means for conveying the components to be dispensed out of the containers (1, 2) to one or more dispensing openings (121), and a control part (4) is present for operating the dispensing means, while air pumping means, mixing means and foam-forming means are also present for mixing the components with air prior to dispensing and foaming thereof for the formation of a foam.

7. Aerosol according to claim 6, characterized in that the dispensing assembly, the main container (1) and the one or more auxiliary containers (2) are designed as defined in one or more of the preceding claims.

8. Aerosol according to claim 7, characterized in that the air pumping means are in the form of an air piston pump (110) which is concentric with the remaining piston pumps, and which is designed to mix air as a component with several liquid components, thus forming a foam.

9. Auxiliary container intended for an aerosol according to one or more of claims 1 - 5.

10. Auxiliary container according to claim 9, characterized in that the auxiliary container (2) comprises a breakable membrane (145) which can be broken by connection to the dispensing assembly.

11. Auxiliary container according to claim 10, characterized in that the auxiliary container (2) is designed in such a way that, depending on the contents

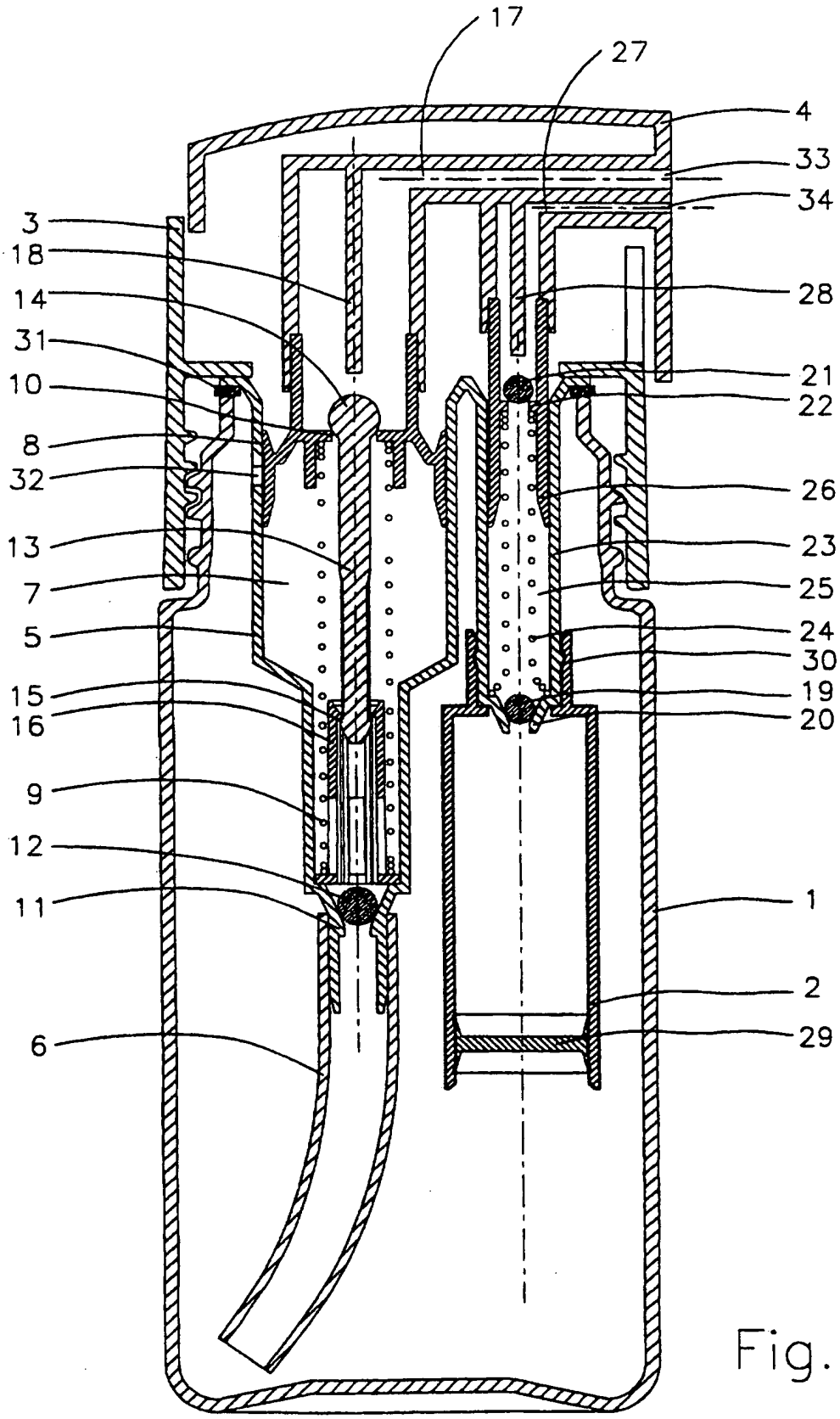


Fig. 1

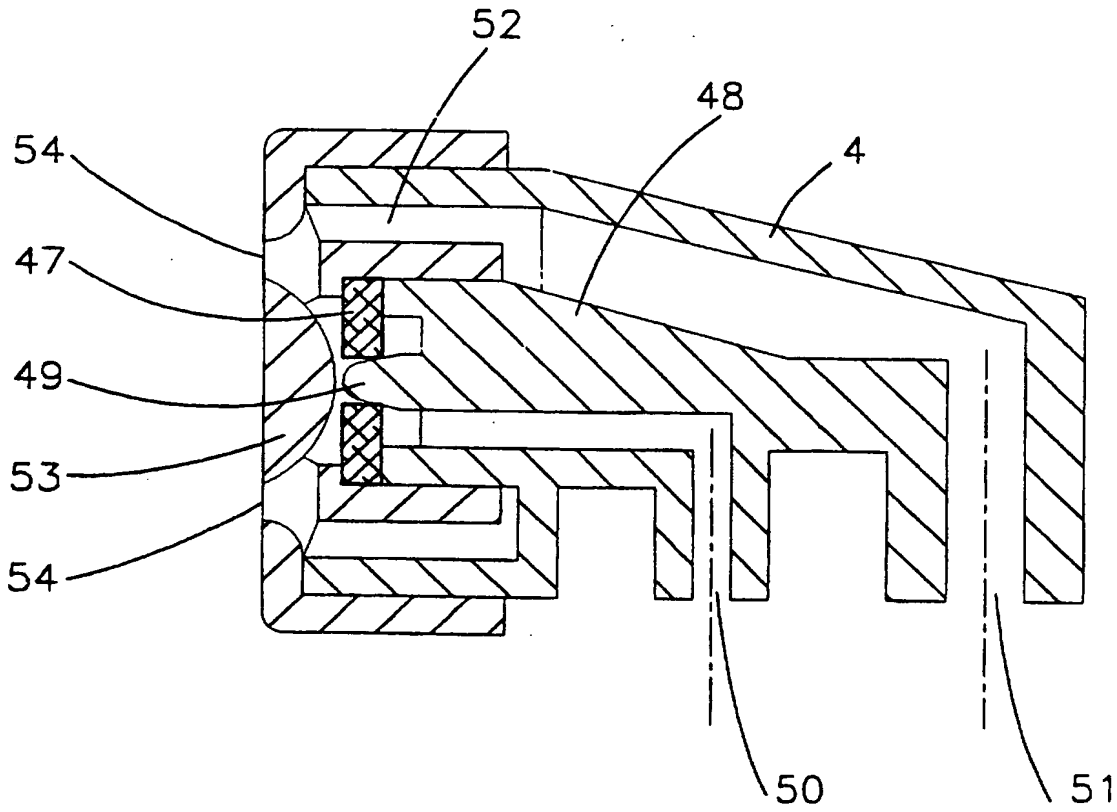


Fig.3

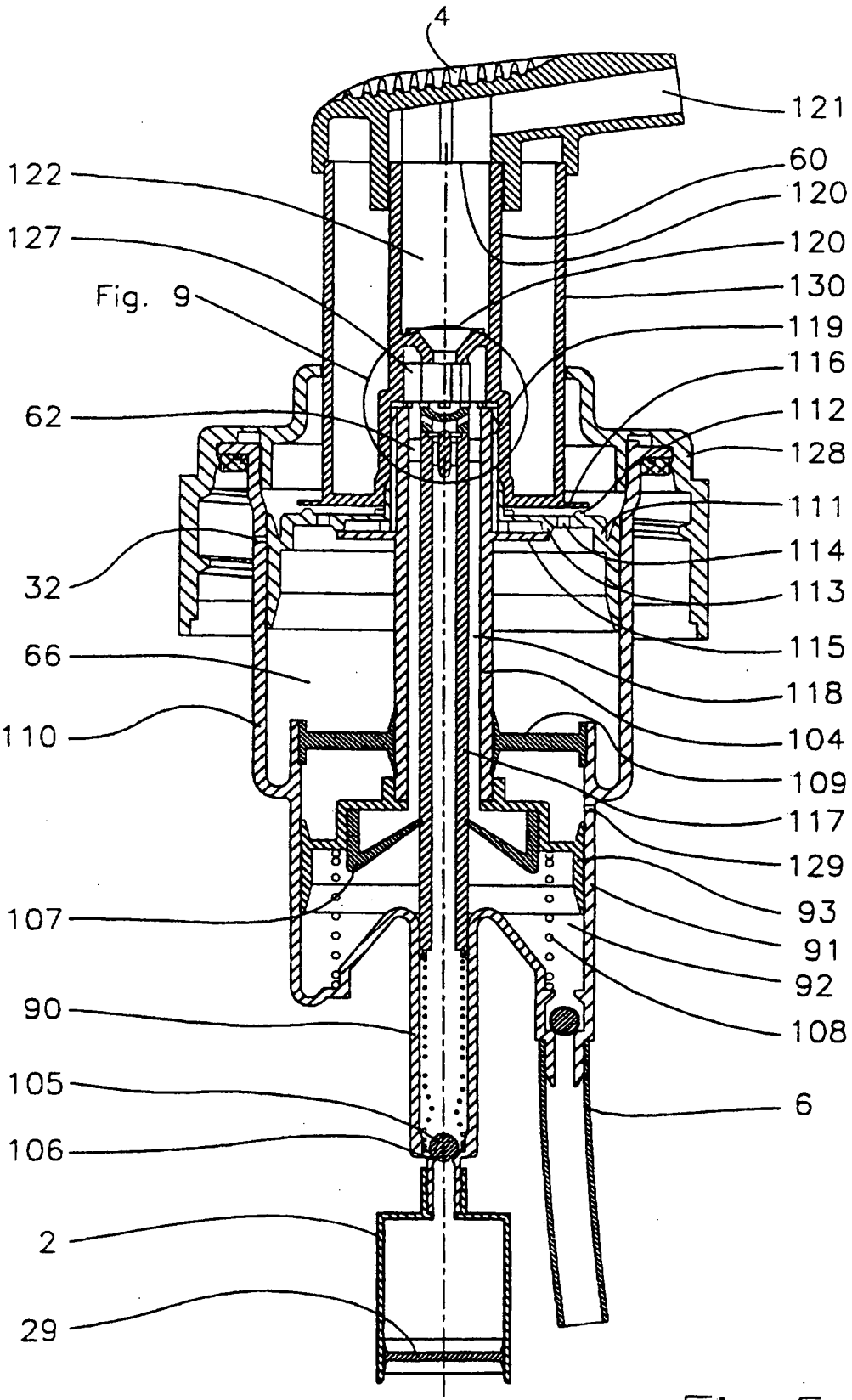


Fig.5

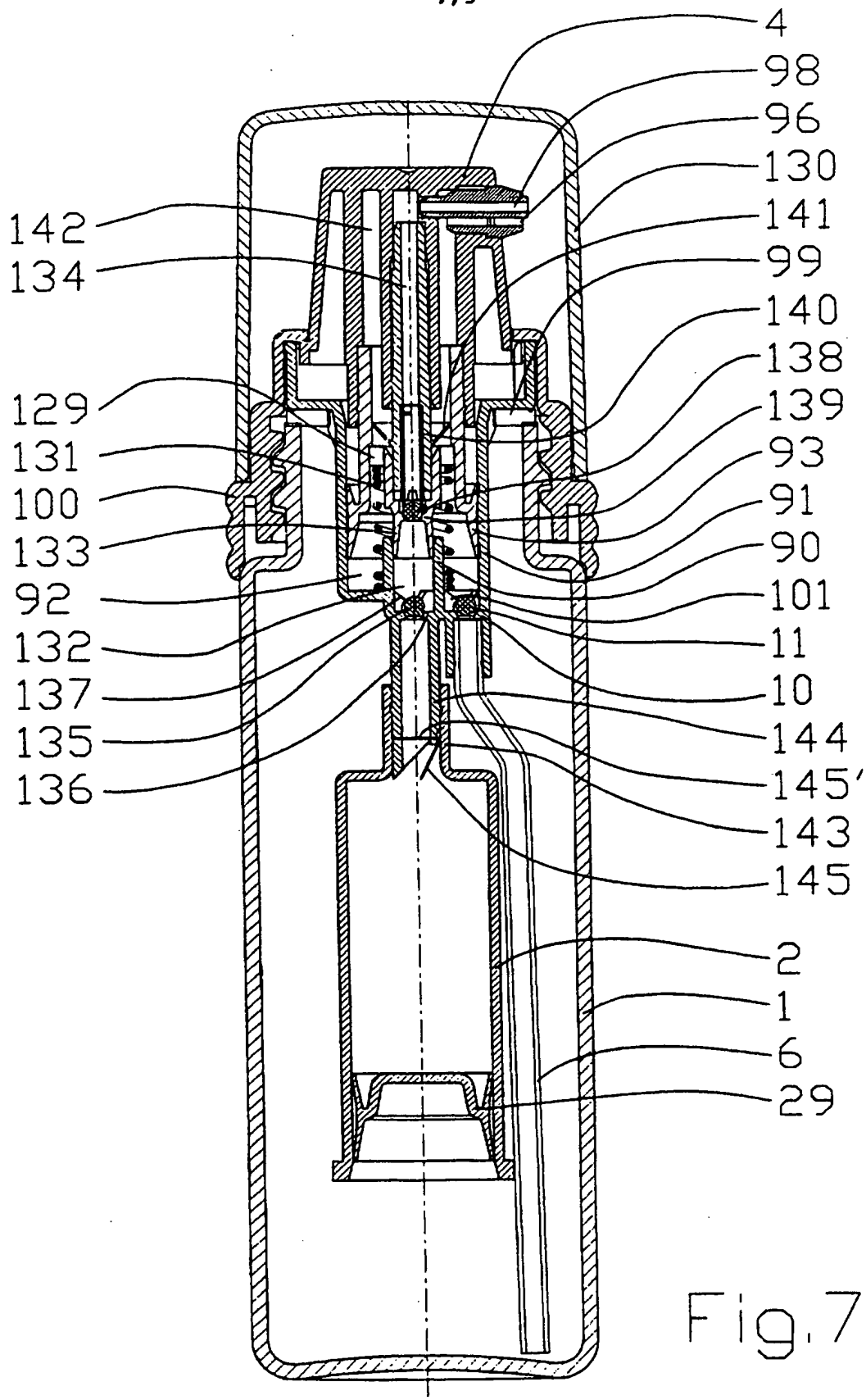


Fig.7

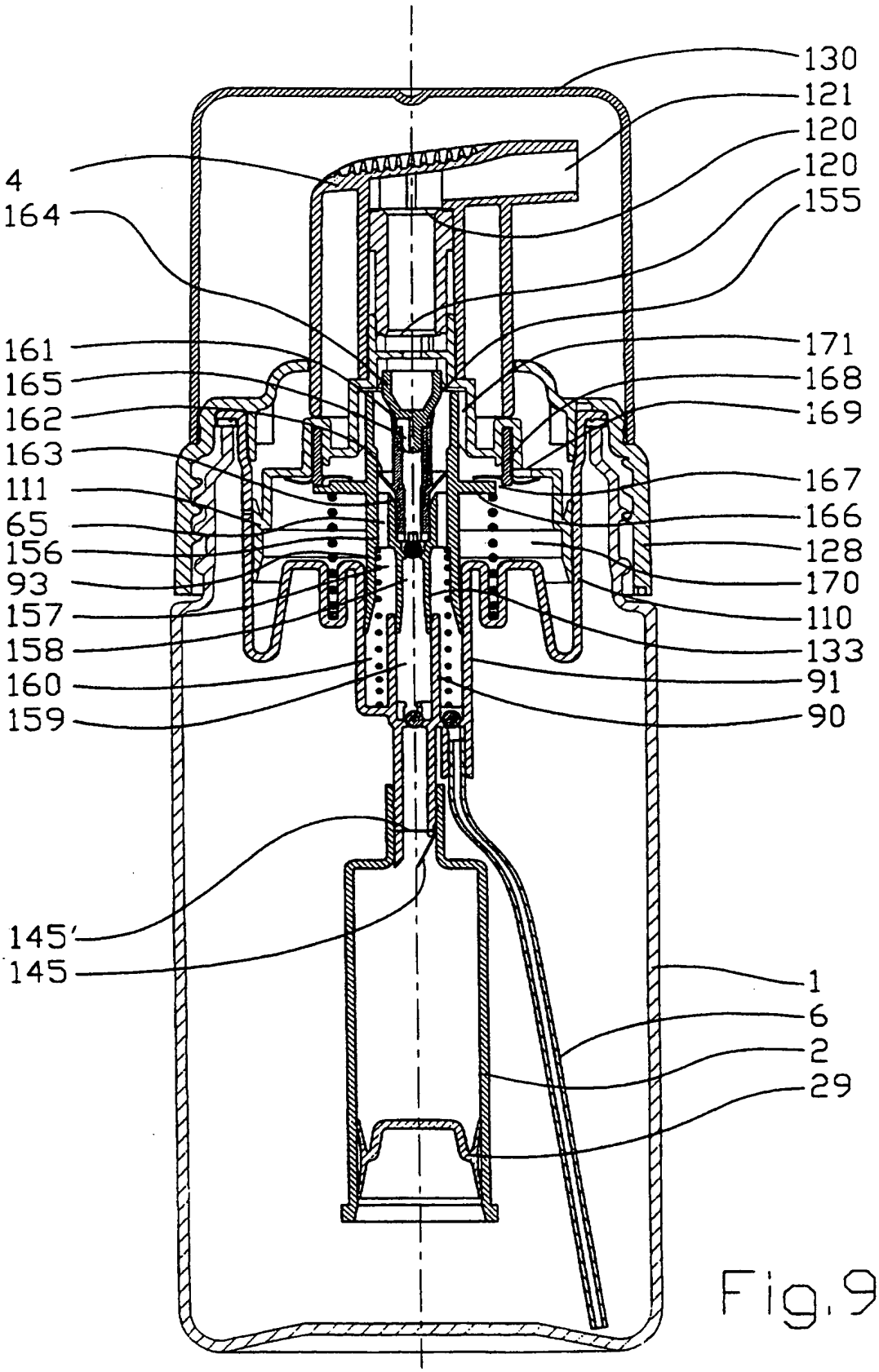


Fig.9

INTERNATIONAL SEARCH REPORT

Inten nal Application No
PCT/NL 97/00028

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 93 04940 A (SMITHKLINE BEECHAM PLC) 18 March 1993 see abstract; claims; figures	1
A	EP 0 318 834 A (HENKEL KGAA) 7 June 1989 see column 2, line 19 - column 3, line 29; figure	1
A	EP 0 613 728 A (DAIWA CAN COMPANY) 7 September 1994 see abstract; figures	6
A	WO 95 30490 A (SANOFI SA ;VANDROMME MICHEL (FR); PILEUR CHARLES (FR)) 16 November 1995 see page 15, line 17 - page 16, line 27; figure 4	6

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter nal Application No
PCT/NL 97/00028

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9530490 A		AU 2618895 A	29-11-95
		EP 0708687 A	01-05-96
		JP 9500325 T	14-01-97